PROPOSED BUSINESS PLAN
COLUMBIA FUEL COMPANY, INC.
(Bennett Process)
April 2005

PROPOSED BUDGET AND SCHEDULE

August 2003

Sell 50,000,000 shares
2nd Offering

4 Year   1.000.000,000
                                                    Study Haul
                                                    Contract Coal & Trash
                                                    Start Carbon Plant
                        SBA 7(j)   Start Market Analysis
                                                    Start 2nd Phase PE
                                                    Let 2nd IPO

3 Year $750,000,000

                                                Pick 2nd Phase Site PE
                                                Const. Tank Farm
                                                Const. Synthesis Plant CO CO_2
                                                Const. & Operate Elec. Plant & PE
                                                Const. Refinery & Light Ends Plant
                                                Transport Refinery from Storage
                                                Construct Plant & PE
                                                Store Materials
                                                Water Access Utilities Get PE
                                                Access for Coal Contracts
                                                Access for Trash Contracts

                                            Construct Coal & Trash Storage
                                            Obtain Property & Get Survey
                                            PE & Develop Staff

1st Offering
Sell 10,000,000 Shares

1.5 Year Maximum $1,000,000

                                    Option Properties & Accesses
                                    Option Coal
                                    PE Design Engineering
                                    Plant & Transportation Study

SBA Technical Loan

COLUMBIA FUEL COMPANY, INC.

April 2005

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The enclosed material contains a
description of the Bennett
patents and privy and/or
confidential information
contained in other Bennett
patent applications. All
information gleamed from this
paper shall be held in
confidence.

CONCLUSIONS:

1. The conditions that have made low temperature coal carbonization uneconomical in the past have now been reversed. The market for aromatics from coal tars now exists in the form of petrochemicals and motor fuel finishers. The use of char in a powdered form for electrical production has evolved; therefore, it is no longer necessary to produce a nut or lump char.

2. The chars will be soft and easy to crush, reactive and readily ignited, burn readily without special attention, and clean burning. It is reported that it may be stored safely and indefinitely in powdered form and it is anticipated that a considerably smaller furnace can be used for boilers than for coal.

3. The coal can be cleaned of pyrites and stored in accordance with normal mining or utility operations. A substantial amount of sulfur in the form of pyrites will be removed.

4. The coal will be roasted in the presence of steam, thus enhancing the quantity and quality of the primary tars and gases.

5. The primary tar will be hydrogenated in the presence of a cobalt-molybdenum catalyst producing synthetic crude oil.

6. The synthetic crude oil will be refined into gasoline, finishers, and/or petrochemicals.

7. The chars will be treated with H_2 and a substantial amount of the remaining sulfur will be removed.

8. The need for a new industry to treat bituminous coals to produce semi coke (char) and liquid fuels can be economically justified.

9. The basic technology for low temperature carbonization of bituminous coals was established prior to 1946.

1

The Bennett Process adds the following new or revised dimensions to the technology:

A. The primary tars can be successfully hydrogenated using the Law technique.

B. The char can be rendered into a low sulfur fuel using FMC and Conoco techniques

C. The heat transfer during carbonizing of the char will be facilitated with constant agitation.

D. The quality and quantity of the primary tars will be increased by inserting steam into the roaster to facilitate gas removal with little decomposition.

E. Carbon monoxides and carbon dioxides will be synthesized into products.

F. Little if any development of new equipment is required. All processes can be conducted within existing technology.

G. The process is not dependent upon closely held foreign gas technology for adequate product production.

H. Low temperature and low pressure processing allows for construction with low cost domestic iron and steel alloys.

I. Critical operations can be carried out in a carbon dioxide or oxygen free atmosphere. If workmen are necessary a life support system will be used.

EXECUTIVE SUMMARY

NON-POLLUTING FUEL FROM BITUMINOUS COAL

By Harold L. Bennett

Our nation is faced with a precarious situation in regard to its energy needs. For energy supplies we are too heavily dependent upon nations that, at the whim of an unfriendly leader, could dry up our sources of vital commodities. The present turmoil in the Far East is a timely warning. Should similar unrest spread to its neighboring countries, the bulk of the world's present oil supplies could cease to flow.

In a few years our own reserves of oil may be depleted, thus making us totally dependent upon imports. At that point we would not only cease to be a world power, but we would be faced with the struggle for survival. Such thoughts are awesome contemplate, but they could become reality. We must take emergency measures to halt that rapid trend toward disaster.

The answer lies in converting bituminous coal into non-polluting smokeless fuels, synthetic crude oils, and aromatic gases, etc, using the BENNETT PROCESS.

It is estimated that the United States has sufficient coal reserves to last for several hundred years. This abundant resource is not being fully utilized because present coal firing technology has a poisonous effect on the atmosphere, or pollution. These problems can be resolved with adequate funding

Attempts have been made to use high-pressure equipment and experiments to do so are still underway. These methods will require five to ten years of experimentation—time

which we cannot afford to waste. It is urgent that we develop a source of non-polluting smokeless fuel and liquid fuel now.

The technology for an alternate process is now in existence; known as the Bennett Process, it will be outlined in detail. The completed design is available and can be implemented upon approval of financing.

The Bennett Process will produce a smokeless solid fuel for U. S./Mexico installations and for current coal fired utilities. This fuel will eliminate the need for high cost smoke stack scrubbers, precipitators and/or sulfur acceptors and their inherent disposal problems.

Capturing the smoke and nitrous oxides and other pollutants prior to electrical generation, etc., will reduce some of the objections to increasing the use of coal over the next 30-40 years. Smoke is the material that is to be converted to liquid fuel, etc., by the Bennett Process.

Electric utility companies do not wish to run gasification and liquification plants. The U.S. public has indicated a distrust of allowing the coal/oil companies to have that responsibility. Therefore, the proposed creation of a new industrial component to provide solid fuel to the electric companies, etc., and synthetic crude for feed stock to the gasoline and petrochemical industry appears to be timely.

The proposed methods will require an increased production of coal in the magnitude of 20 to 30 percent, depending upon the volatile content of the coal used. Additional transportation should not be a problem as the initial facilities can be located so as to take advantage of existing rail, pipelines, barging, coal supplies and utility sites.

4

DEVELOPING THE PROCESS

We would propose that stock in the existing corporation, i.e., Columbia Fuel Co., Inc., be opened and revised to have at least 10,000,000 Common shares and the authority to issue 10,000,000 Preferred shares. The company would seek financing to construct a facility as described above in Western New Mexico. Preliminary inquiries have been made with Giant Oil Company.

Due to the complexity of the total project, we would propose to issue 10,000,000 LLC common shares to the Columbia group, and for example 900,000 Preferred shares plus 100,000 Common shares to the Underwriters. An IPO would be made as soon as we can get the char operations started.

Additional funding will be requested to develop the petrochemical and lightends plants, etc.

MARKET PRODUCTS TO BE DERIVED

The initial installation will produce the following critical material (from bituminous coals, lignites, soft trash and sewage):

1. Clean burning smokeless boiler fuel for electricity and heat production in western U.S. and eastern U.S. defense facilities, production of steel, filters and activated carbon products..

The initial market will be in New Mexico, Arizona, Colorado, Utah and the western United States. The market area will be further expanded throughout the United States and Mexico as new products are developed.

Additional products can be developed with additional refinery and petrochemical equipment.

1. Benzenes, xylenols, toluene, butane and propane for finishing non-lead gasoline and necessary additives for plastic production. Also basic ingredients for other fuels and explosives will be produced.

2. Lead free gasoline for domestic vehicles.

3. LPG for bottled heat and power at isolated facilities and production of synthetics fuels.

4. Low sulfur coke for steel production, activated carbon filters, hydrogen, etc.

5. Sulfur for chemical production.
6. Hydrogen gas for auto fuel, etc.

ADDITIONAL DATA

It has been decided that we will that we will use up to 20% by weight of solid waste material during carbonization of the coal. This material will be hydrocarbon trash, solid sewage, peat and farm waste. We will contract with various cities for these materials, which will be transported by train, barge, etc. to the plant site. The cities will pay for the transportation of these materials.

The feedstock (coal) can also be peat or lignite from Texas or Mexico.

The company could use an existing NM corporation, CJL, which is a subchapter "S" corporation. This would allow the principal stockholders to take personal advantage of any federal tax discounts.

BENNETT PROCESS

Introduction

As an alternative to petroleum derived fuel, we propose to utilize available and existing technology to produce synthetic crude oil and smokeless solid fuel (char) from bituminous coals. The synthetic crude oil derived from low temperature coal tars can be processed by any of several systems well known in the petroleum refining industry. The initial step in processing tar is to treat it with hydrogen, thereby converting it to synthetic crude oil. A naphtha boiling below 250° C rich in aromatics and phenols will be distilled.

The char residue produced at low temperature may be utilized as fuel in producing electric power or may be further reduced to coke. The char will retain enough volatile matter to be considered medium or high volatile fuel. It will make good smokeless fuel for domestic and industrial usages.

The clean Bennett produced char will lend itself to fluidized bed combustion methods. With its clean-burning, smokeless, low CO_x and NO_x emissions, the fuel should prove to be an enhancement to the utility industry.

To facilitate the analysis of the Bennett Process, this paper has been modeled from papers produced by TVA of various processes used in flue gas desulfurization and a paper by P. S. Farber et al of Argonne National Laboratory.

HISTORY

Late in the 1940's the research work on low temperature carbonization sponsored by the Bureau of Mines, Department of the Interior, was sharply curtailed and the research emphasis shifted to coal liquefaction and/or gasification. The markets for smokeless solid fuel and synthetic crude had not developed and it was apparent that they would not develop in the near future. The war was over and adequate petroleum reserves were available. The home heating, industrial and railroad uses of coal were on the decline with the advent of interstate transportation of natural gas. Adequate metallurgical coking coals were available and hydrorefining of crude oil was supplying the budding petrochemical industry with adequate feedstock.

There were adequate liquid and gas reserves for the foreseeable future. Therefore, many regulated industries were permitted to convert from coal to oil or gas. The bituminous coal industry was depressed and the anthracite coal companies were abolished. This was done on the assumption that the problems of developing coal liquefaction and/or gasification would be adequately solved prior to depletion of the petroleum reserves. This has proven to be a false assumption (Oil and Gas Journal).

Other factors not foreseen in the late 1940's were:

1. The surging development of the petrochemical industry.
2. The Environmental Protective Act.
3. The Mine Safety Act.
4. The emergence of the third world countries and their inflationary pricing of their petroleum exports.
5. Lack of an agricultural export pricing policy.

All of these have tended to increase our dependence on the petroleum industry and increase our demand for liquid products.

The Bennett Process, like the modern Portland cement concrete and Roman concrete or modern steel alloys and Damascus steel, is a wedding of the best of the old German and the current U.S. technology to the space age equipment, materials, and marketing practices.

Rhodes defined the German synthetic program as the methods and technology to produce the maximum amount of liquid petroleum products and metallurgical coke for steel or char for electricity production.

The Bennett Process will treat bituminous coals in a low temperature manner to produce a soft, easily ignitable char particle (-3/8"); synthetic crude oil high in aromatic and/or aliphatic

9

compounds; gases for plant heat, H_2, and product production, and/or synthesizing; and various inorganic compounds containing sulfur and/or ammonia.

The process is dividable into five distinct areas:

1. Coal processing and clean up.
2. Carbonization.
3. Synthetic crude production.
4. Gas processing.
5. Char clean up.

COAL PROCESSING AND CLEAN UP

Depending upon the origin of the coal, the pyrites and shale or slate should be removed prior to roasting the coal. This may involve crushing and hydraulic separation by one of several methods known to the industry.

Even though the pyrites are exothermic when roasted, the additional sulfur in the roaster gases may tend to be undesirable and the heat of the char particle will not be controllable.

The cleaned coal, to satisfy the material on hand requirements of various electric companies, will need to be stored for several weeks. To prevent drying and loss of volatile material and subsequent reduction in tar production, the coal shall be stored in a wet or damp condition and surface dried just prior to roasting thus preventing weathering and oxidation.

The coal shall be transferred from the storage-drying area via a continuous belt to a hopper arrangement at the top of the roaster. The feed shall be adjustable and coordinated with the speed of the roaster arms so at to provide adequate carbonizing temperature and retention time in the roaster.

COAL FIRING

Char – a product of low-temperature carbonization and thermal decomposition of bituminous coal.
Char is referred to as semi-coke (producer fuel) or smokeless fuel containing from 10 to 15 percent of
volatile matter. It is highly porous and friable. It is non-caking and water free. The decomposition of
coal results in a 70% reduction in volume. A use must be found for the 70% of the coal residue (char).

The firing of producer char in a solid fuel boiler would have many advantages as follows:

1. It would be delivered in powdered form. No grinding costs.

2. It would burn without soot or smoke. No emitter screening.

3. It would be water free. Reducing plant maintenance and burning costs.

4. A minimal amount of volatile matter will be present in the flu gas. Some hydrogen will be
   present and will react with the carbon to form $CO-CO_2$.

5. The dew point of the water pressure will be below 101°F. The dew point of natural gas is
   reported to be 139°F.

6. All FOB for coal can be absorbed by the carbonizing plant.

7. By installing a $CO-CO_2$ synthesizer with a condenser in front, all carry-over particles will
   be returned to the bed.

The utilization of this char material in electric producing boiler plants will, therefore, result in a
substantial savings (up to 30% estimated).

PRIMARY GAS FROM COKE PRODUCTION

Depending upon product specifications and the coal used, it may be desirable to further process the sulfur reduced char into a low volatile coke. The additional heat to produce the coke could be in the form of super heated steam, hot gases, or indirect heat. Regardless of the type of heating used, a gas rich in methane and free H_2 will be released. This gas, if evolved, will be used for heat, H_2 and the CO synthesis process to produce oil and alcohol.

Preliminary analysis of the process indicated that for most high volatile, non-coking coals there will be substantial gas evolved containing H_2 for the necessary reaction and enough hydrocarbons to balance the processes heat requirements.

As described above the heat balance demands can be adjusted with the production of water gas and/or coke. Excess gases can be utilized to produce synthetic oil and alcohol and/or gases can be developed into products in a light ends plant.

Refinery

The section from the gas clean up and tar removal forward shall be considered the refinery portion and costs will be estimated on the basis of refinery methods set out in the Oil and Gas Journal. The estimate will be based on Costimating and Nelson Inflation Indexes as is common in the industry.

Basis of Estimate:

The plant shall have a battery limit of 15,000 barrels per day (B/D) and an estimated thru put of 14,000 B/D of synthetic crude oil.

The roaster shall derive 10,730 B/D of low temperature tar which shall be hydrogenated with an · expansion factor of 120 to 140%.

The reactor is a high-pressure catalytic cracker with a fixed bed catalyst. A modified standard catalytic cracker will be satisfactory. Hydrogen uptake shall be 1200 to 1500 scf per barrel (bbl). The output shall be distilled in an ordinary petroleum topping tower. The distillate shall be naphtha boiling below 250° C, rich in aromatics and phenols. All bottoms shall be recycled and receive additional hydrogen treatment.

For simplicity of preparing this estimate, the naphtha shall be considered at the current U.S. price.

The refinery envisioned is estimated to have a complexity factor of 6.5 which is about normal for a plant of this small size.

Gas evolved by the reactor and the topping tower distillation will be transferred to a gas plant.

Process Description Used for This Estimate

The power plant is an integrated facility that includes the equipment necessary to clean the coal, convert the coal to char, convert the char to heat and electricity, remove the gases containing coal tars from the char, produce synthetic crude oil, and produce sulfuric acid and fertilizer.

The coal is to be delivered to the yard where it is crushed and mechanically cleaned. The crushed clean coal is transported by belts, etc. to the top of a multi-hearth roaster. The volatile matter is removed by indirect heating. Gases containing tars are removed from each level as quickly as possible to prevent further decomposition.

The gases are cooled and the tar condensed. The condensed tar is treated with hydrogen in the presence of a catalyst and under pressure (hydrofining). The synthetic crude oil so derived is fractionally distilled and the naphtha derived. Additional products such as gasoline and petrochemicals can be derived from the naphtha; however, it is not necessary to discuss additional processing in the economic analysis.

The hot char is transferred to the bottom area of the roaster via rotating arms at each level. There it will be treated with H_2 gas or with a gas containing H_2 developed by using steam to cool the char.

$$H_2O + CO \leftrightarrow CO_2 + H_2$$
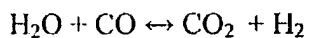
The char will contain substantially reduced amounts of sulfur if present and will be sized less than 3/8 inches. This material will be cooled as necessary and stored for fuel to make electricity, etc..

For the purpose of this analysis, the major by-products of the fuel-processing system are sulfuric acid, ammonia, synthetic crude oil (naptha), and petrochemical feedstock, LPG and electric plant heat.

15

TABLE I

Size of Tar Reactor and Distillation Unit

Tar   23.8 gal/Ton or coal*

      Coal carbonized   10,500 T/D

Tar   23.8 gal/T X 10,500 T/D/44gal/B   5,680 B/D

Tar to H_2 reactor = synthetic crude

      SC = 120 to 140 % of tar

      5,680 B/D X 1.3 fac   7,383 B/D

Tar at 1.40 expansion   10,340 B/D

Therefore, assume battery limits of   10,000 B/D

TABLE II

A Typical New Mexico Coal Used to Analyze the Bennett Process

Assumed Coal Source*

State	New Mexico
County	San Juan
Bed	No. 4
Sulfur	2.2%
Volatile Matter	43.8%
BTU Value Coal	13,630. BTU/lb.

Carbonizing Temperature   500° C

Output

Tar Yield	23.8 gal/Ton coal
Char Yield	64.5% of coal
Char BTU Value	14,270 BTU/lb.
Gas Yield	2,000 cf/Ton coal
Gas BTU Value	830 BTU/lb. Coal

*Values derived from U.S. Dept of Interior Technical Paper #525, "Carbonizing Properties and Constitution of....Indiana No. 4 Bed Coal from Saxton No. 1 Mine Vigo Co. Ind..." and modified for New Mexico coals

TABLE III

Gas Clean Up

From TVA Report
Reduce sulfur from 5% to 3.5% by mechanical clean up if necessary.

From FMC Report Using a Colorado Coal
Reduced by .4% sulfur from coal by roasting and clean from tar

From FMC Report
Reduce 60% of sulfur from char by flash addition of H_2 in first 2 minutes. (shallow bed)

The results should be within the 85% removal requirement set out in the proposed EPA Standards.

BASIS

2600 ft. of gas evolved during roasting
.06% by volume of synthetic crude evolved as gas in distillation per Fischer
H_2, H_2SO_4, N_2, CO_2 removed from gas
Remove 33.7% for impurities
2600 cfs - 876 cfs = 1724 cfs methane gas/ton coal
@ assumed minimum of 1000 BTU/cfs =
1,724,000 BTU/T coal =   34,480 MM BTU/D

From Tar Reactor
.06 X 99% = .59% as light oil
20,000 T/D X 23.8 gal/T X .06 = 28,560 gal.
$\frac{28,560}{SG\ .771}$ = 37,428 gal.
Light oil equivalent = 102 BTU/lb. of coal
102 BTU X 20,000 X 2,000 =   4,080 MM BTU/D

From Coal Distillation
Light oil equivalent 140 BTU/lb. coal
140 BTU/lb. X 20,000 T/D X 2,000 lb. T =   <u>5,600 MM BTU/D</u>

         TOTAL BTU AVAILABLE =   44,160 MM BTU/D

Char clean up costs were prorated from the FMC report and <u>Oil & Gas Journal</u> for April 2, 2001. Claus clean up process was directly prorated for the acid unit from the TVA report Table B21 (noting that the table was based on 1.5 MM Ton/yr of coal). The costs were only doubled because our producer gas is higher quality.

Gas clean up costs were developed from values for H_2 adsorption, nitrogen recovery and H_2 reform from the amount of CO gas developed in the system according to <u>Oil & Gas Journal</u>.

Refinery costs were developed from <u>Oil & Gas Journal</u> Costimating Series and Nelson Cost Index Inflation Factors. The current literature on the subject verifies the accuracy of the method. It was assumed that a fixed bed hydrofiner with a high efficiency distillation tower was used to convert the tar to synthetic crude oil.

Materials—coal cost was established in P. S. Farber (of Argonne) Paper 3A page 27 as $1. per M BTU's and expanded to $1.7 per M BTU's. For continuity of comparison, we have used the latter value.

Conversion costs were taken and were prorated from the costs shown in Table B1 PCC Process 1 by TVA. (Clean coal storage was moved to the section on char cleaning.)

The roaster costs were prorated by FMC titled Char Oil Energy Development. The costs shown as 1967 were expanded by Nelson Cost Index Inflation Factors from 1.83 to 173.2 for 2005

TABLE IV

Heat Requirements

Coal heating to 600° C

10,500 T/D X 2000 lb./T X 2812.5 BTU/lb. coal = 59,060 MM BTU/D

Amount of O_2 in coal   Assume 22.5%
   From Fischer use 176 cal./lb. char
   Char uses 12,703 MM BTU/D
   Assume 40% eff. – 31,750 MM BTU/D

Well within allowable 44,160 MM BTU/D from Table III

Leaving   5860 MM BTU for refinery heat

TABLE V

H_2 Recovery Balance

Assume no H_2 recovery from reactor or distillation as it is a continuous operation and H_2 remains in system.

   H_2 available = 23.4% of gas X 2600 scf/T coal
   680 scf X 20,000 T/D = 13,600,000 scf/D

H_2 required for tar clean up
   23.8 gal. Of tar/T coal X 10,500 T/D X B/42 gal X 1200 scf/B = 7.14 MM
                                                                          scf/Day

H_2 available from char clean up by
   $H_2O + CO \leftrightarrow CO_2 + H_2$
   H_2 needed for H_2S is 0.05% of off gas from char clean up
        with 95% H_2 processed.
           .7 lb. H_2/hr/lb. char (per FMC)

H_2 needed for HS removal = 575/1440 MM scf H_2 = .8 MM scf/day
.8 MM scf H_2 produced by steam injection (reform) and incomplete oxidation of
   char.

TABLE VI

Hydrogen Sulfide and Nitrogen Oxide Removal Costs

NO$_x$ Removal

      1.2% of 2600 scf = 31.2 scf/T coal

      31.2 scf/T X 10,000 = 312,000 scf

      Plant cost $.20/M scf = $.2 Million

H$_2$S Removal from Synthetic Crude Production

      Remove .5% of 2600 scf/T = 13 scf/T

      13 scf/T X 10,000 T/D =130,000 scf/D

      1.5% X 10,000 T/D = 300,000 lb/D

      From Oil & Gas Journal 9-11-78

           Assume 505 LT/D recovery with char clean up $2 MM

TABLE VII

Basis of Design

Using New Mexico San Juan County coal and processing it nearby beginning in mid 2006, average basis of cost scaling, ending 2006; operation time 7,920 hr/yr (330 days), a 36% increase over TVA.

15 day raw coal and 15 day clean coal storage capacities.

Working capital provides 3 weeks raw coal consumption, 7 weeks direct revenue costs (excluding BTU loss) and 7-weeks operating overhead.

Refuse disposal located within 1 mile from plant sites.

Raw coal (moisture free) 3,300,000 ton/yr, 5% S, 7.0% Ash, 11470 BTU/lb

Clean coal 3,050,000 Ton/yr, 3.67% S, 8.0% Ash, 1200 BTU/lb.

Char to boiler from roaster 2,800,000 T/yr with 13070 BTU/lb and 11.6% ash for boiler, 200 MW coal-fired power plant operating at 9500 BTU/kwh and 5500 hr/yr.

The methods and procedures for processes shown are for estimating purposes only. The final types of equipment and methods will be determined during design and will depend upon market conditions, site selection, and the coal or coals to be used. The most conservative costing was used. For example, there is no reason to believe that it will be necessary to use a claus sulfur dioxide process when the major portion of the sulfur will be in the form of hydrogen sulfide; however, if it is determined to process any pyrite and develop an acid product, the process may be necessary.

Environmental considerations will be minimized. By siting near an electrical utility, the waste steam and heat can be purchased and utilized in the process. The clean fuel will result in a substantial reduction in stock emissions. The process itself will only generate emissions from the development of the necessary heat for the coal roaster and steam production.

TABLE VIII

Product Value

	MM $/YR
Synthetic crude oil values	
10,000 B/D @ 330 d/y = 3,300,000 B/y	
@ $1.31/gal. = $55.00/B =	$ 550.00
Char value	
@ $41.09/Ton X 2.45 MMT/yr =	$ 91.40
Sulfuric acid	
@ $58.65/LT X 175 LT/D X 330 D/yr =	$ 3.30
Ammonia	
@ $100/LT X 33 LT/D X 330 D/yr =	$ 1.10
Light ends	
5% of crude oil = 165,000 B/yr	
$165,000 B X 44/gal/B X $1.60/gal. =	$ 11.61
Sub total	$ 657.41
Solid waste	
20% X 10,500 T/D X 330 D/Yr X $65/T FOB plant	- $ 38.31
Total Income	$ 319.10

TABLE IX

Total Capital Investment

Direct Investment	Investment MM$
A. Coal receiving, storage and clean up	
a. Receiving, storage (10,500 T/D)	$ 6.03
b. Raw coal sizing	$ 1.10
c. Coarse coal cleaning	$ 1.08
d. Intermediate coal cleaning	$ 1.53
e. Fine coal cleaning	$ 1.88
f. Solid waste storage	$ 2.08
	$ 13.70
B. Roaster (Pyrolysis 10,500 T/D)	$ 12.02
Gas handling, removal, recovery, and clean up	$ 7.05
Tar removal & recovery includes dust precipitation	$ 2.90
	$ 22.05
C. Char clean up 6825 T/D	
a. Desulfurization including	
Contactor	
Separator	
Char cooler	
b. Regenerator including	
Acceptor cooler	
Contactor	
Acceptor heat and calciner	
c. Recovery including (400 LT/D Claus unit)	
Burner	
Wash Heat Boiler	
Converters	
Condensers	
CO_2 Stripper and scrubber	$ 26.45
Acid Production	$ 6.82
Acid Storage	$ 1.16
Clean Char Storage	$ 4.14
	$ 38.57
D. Gas clean up	
Hydrogen recovery	$ 1.50
Nitrogen recovery	$ 0.70
H_2 production (steam reform or other)	$ 9.88
	$ 12.08
E. Refinery	
Refinery 12,500 B/D @ $4776/bbl day	$ 59.70
(complexity 6.5)	
F. Steam plant including water storage pipes (and wells if necessary)	$ 4.133
Total Direct Investment	$135.88

22

TABLE IX (CON'D)

Indirect Investment

Engineering design and supervision	$ 14.44
Architect and engineering contractor	$ 2.11
Construction Expense	$ 19.91
Total indirect investment	$ 36.46
Contingency	$ 4.00
Total fixed investment	$ 40.46

Other Capital Charges

Allowance for startup and modifications	$ 28.74
Interest during construction	$ 35.50
Total depreciable investment	$ 104.70
Land 40 ac. @ 2,000/ac.	$ .08
Working capital	
3 weeks raw materials	$ 18.99
7 weeks direct construction	$ 5.16
Total capital investment	$128.93

Electric plant co-generation
RR extension and siding
Plastic plant co-utilization with light ends plant
Roads
Warehouse and offices $ 71.07

                                                         $200.00

23

TABLE X

Annual Revenue Requirements

Direct Costs			Investment/Yr in MM$
A. Coal cleaning, storage and receiving			
Material—Coal @ $1.5/M BTU* =			$ 70.50
Conversion costs			
Operating, labor & supervision			$ 2.709
Utilities			
Water			$ 0.008
Electricity			$ 0.803
Diesel fuel			$ 0.139
Materials			$ 0.554
Maintenance 6% of direct investment			$ 1.641
			$ 96.34
B. Roaster			
Diesel fuel			$ 0.514
Utilities (including water)			$ 4.600
Labor & Supervision			$ 4.600
Materials			$ 4.968
			$ 14.682
C. Sulfur removal and acid plant			N/A

D. Gas clean up   Utilities

$ 1.093

	¢/bbl	
Cooling water		$ 0.189
Feedwater		$ 0.069
Labor & supervision		$ 0.262
Material		$ 0.154
		$ 1.767

E. Refinery costs	¢/bbl	
Labor & supervision	31.0	
Energy	37.2	
Maintenance & materials	5.2	
Chemicals	12.8	
Supplies	1.4	
Water	1.4	
Sub total	89.0	
Octane charge	28.2	
Process unit costs	117.2	$ 20.00

(Using FMC 1974 refinery estimate expanded to 2005 = $25,830,000)

*Includes credit for solid waste disposal.

TABLE X (CON'D)

Investment/Yr in MM$

F. Steam plant $ 0.10
       Material
       Water
       Labor & supervision
       Utilities
       Heat is derived from coal and credit for
             heat is included in product value

Total Direct Costs	$ 132.89

Indirect Costs

Capital charges
       Depreciation, interim replacements, and
             insurance at 6% of total depreciable investment $ 19.83
       Average cost of capital and taxes @ 8.6% of total
             Capital investment $ 7.98

Overheads
       Plant, 50% of operating labor & supervision $ 4.928
       Administrative, 10% of operating labor and supervision $ 0.985
       Marketing, 10% of sales revenue $ 8.370

TOTAL ANNUAL COSTS	$179.07

Credit from product sales $183.70

**BELOW IS AN EXCERPT AND ABSTRACT OF THE IMPROVED PATENT REVEALED
AND FILED IN JUNE 2001**

IMPROVED PROCESS FOR PRODUCTION OF LOW TEMPERATURE CHAR DURING
PRODUCTION OF LOW TEMPERATURE TARS PER PAT. #3,576,734

Harold L. Bennett, Albuquerque, NM, Assignor to Bennett Engineers and Associates, Austin,
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ABSTRACT OF DISCLOSURE

An improved process for the production of smokeless (low CO_2-CO emitting) boiler fuels which have
been obtained by careful temperature control and the addition of waste, trash or other carbon material
during carbonization of various coal materials such as tar sands, bituminous coal, peat and lignite, and
oil shale.